Increasing reliability
Understanding risk and managing it through Process design, monitoring and intervention

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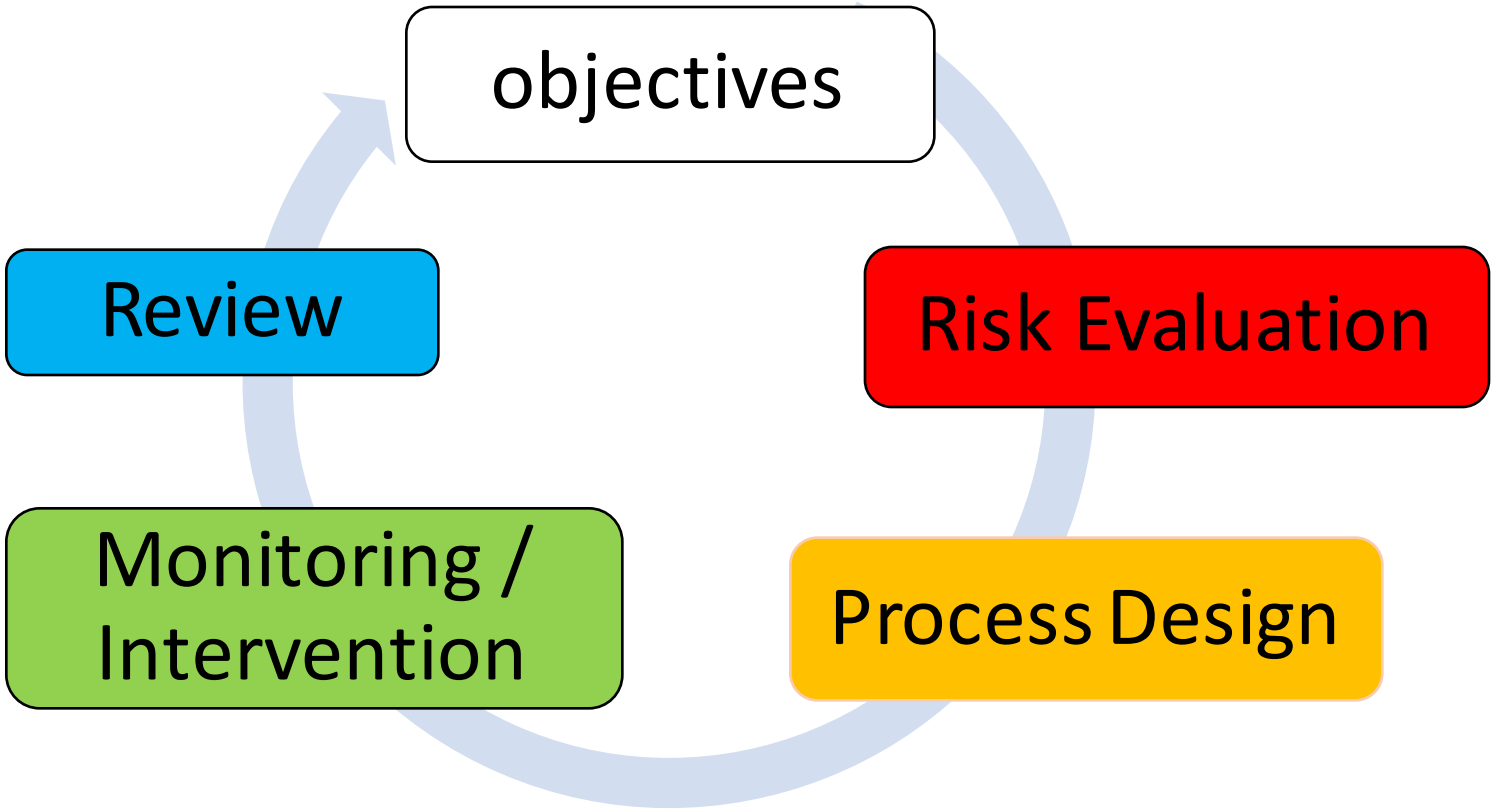
Proteaflora

Increasing reliability:

process design, monitoring and intervention



Proteaflora

- Producer of premium flowering Proteaceae in Australia
- Trains and supports partners in Australia and Overseas

<u>The Challenge of reliability</u>

- Proteas: Specialised adaptations and narrow tolerances
- Advising partners in varying climatic regions:

    Australian States, Europe, South Africa, Japan

Products and cumulative growth hurdles

Managing Risk: Example

- <u>Serruria florida motherplants</u>

January: yield 30 cuttings 8cm x 3-4mm diameter

- 1/ Very sensitive to nutrient levels
- 2/ Very sensitive to water relations
- 3/ Susceptible to a disease (Elsinoe)

Risk Assessment: The components of risk:

Asset : e.g. Serruria Motherplant. Yield of 30 cuttings

Vulnerability : *A susceptibility of the plan*t

Threat : *Interacts with a vulnerability to jeopardise the asset*

Consequence: likelihood and severity of impact.

Risk Assessment: The Asset

Asset – What is at risk?

Definition of the asset

- Quality features
- Other aspects – i.e. timing

Value

- High
- Medium
- Low

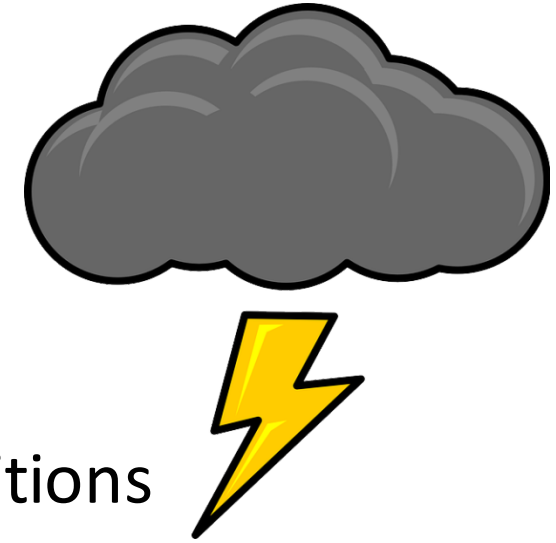
The Elements of Risk: Vulnerability

Serruria Motherplant vulnerabilities

- Nutrient sensitivity
- Sensitive to water relations
- Disease susceptibility

Having a theory of the problem is essential to frame response

The Elements of Risk: Threat



Nutrient excess

- Nutrient supply + climatic conditions

Water Stress

- Water supply+ potting media + climatic conditions

Disease outbreak

- Climatic conditions + presence of pathogen

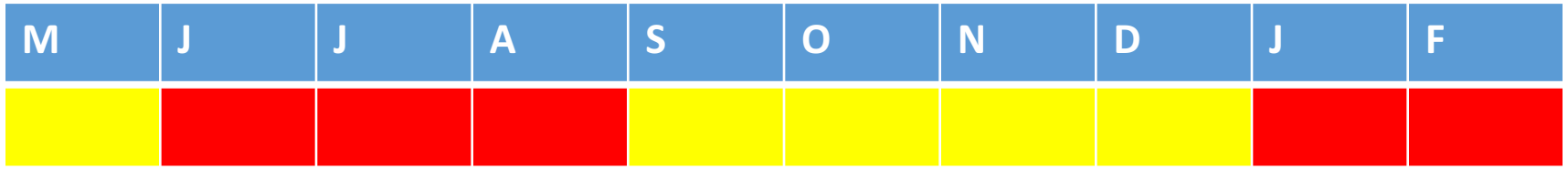
Risk Assessment

Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	High	High	Extreme	Extreme	Extreme
likely	Moderate	High	High	Extreme	Extreme
Moderate	Low	Moderate	High	Extreme	Extreme
Unlikely	Low	Low	Moderate	High	Extreme
Rare	Low	Low	Moderate	High	High

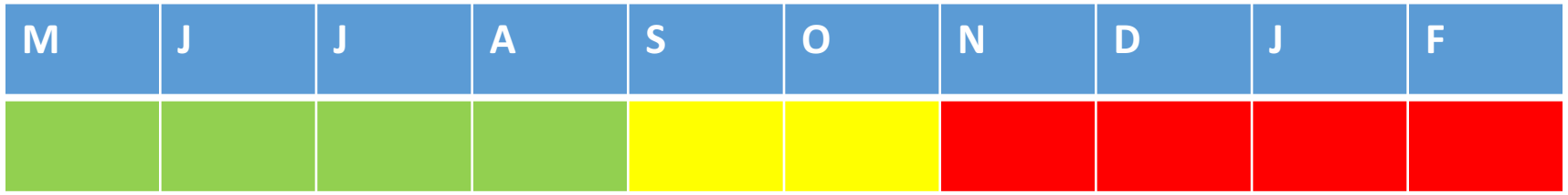
Risk: Critical Risk (and control) points

Nutrient Sensitivity

Water Relations



Disease Outbreak



Risk response: process design and monitoring

Variety	value	Risk	Key Risk	Critical Risk Time	Process Design	Monitor
1	H	H	Nutrient	Winter, Summer		
2	H	H	Water	Winter, Summer		
3	H	H	Disease	Nov-Feb		

Managing Risk: Process Design

Avoiding or reducing risks by changing the process

- Often the most cost effective way to manage risk

Conservative vs “optimised” process

Process design: nutrient sensitivities

“Conservative” process to reduce risk

<u>Reducing Threat: Blushing Bride Motherplants</u>

- 1/ Feeding strategy: Part CRF part liquid feed, Buffers
- 2/ Potting Mix properties : open mix (leaching)
- 3/ Scheduling – avoiding stress, buffers

Process design: Reducing disease risk

Reducing Vulnerability

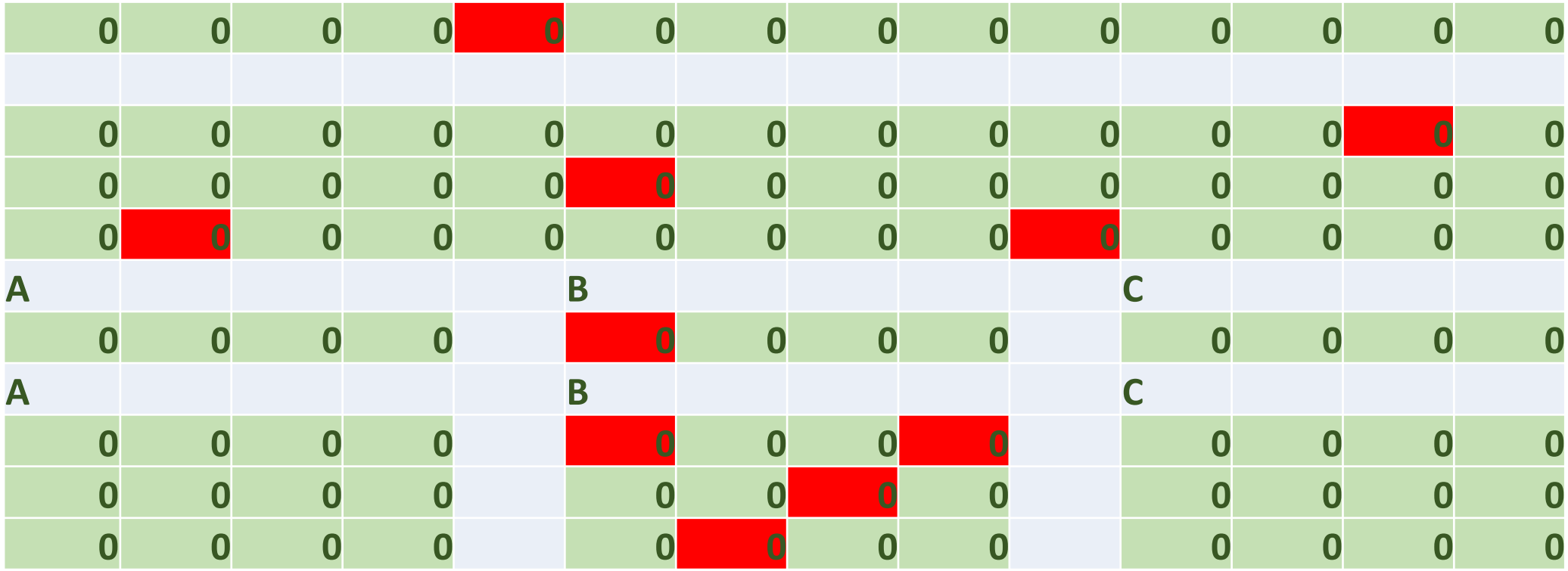
- Preventative spray program (Spring-Summer)

Reducing Threat:

- Growing under cover
- Hygiene standards
- Irrigation by dripper
- Batching

Process design: Batches and limiting loss

- limits scope of problem
- Enables Traceability



Process design: Summary

- Overall- conservative approach to scheduling

Vulnerability	Threat period	Strategy
Nutrient	Winter, Summer	Conservative feed Part CRF part LF
Water	Winter, Summer	Pot mix porosity +water Summer
Disease	Spring- Summer	Under cover, drip , sprays, batching

Monitoring and intervention: Process and Plant

Purpose of monitoring:

- To detect deviation
- To drive intervention

Monitoring of process:

- Detection of deviation in treatments or conditions

Monitoring of Plant

- Direct observation of the plant to detect deviation.

To drive an intervention to protect the outcome

Monitoring and intervention: Proxy varieties

Monitoring and intervention: Process

Vulnerability	Monitoring	Intervention
Nutrient sensitivity	Soil tests	Leaching, nutrient application
Disease susceptibility	Weather	Sprays
Water	Delivered irrigation volume	

Monitoring and intervention: soil tests

Potting mix tests: fast, practical done on-site

Basic test kits are readily available:

<u>Examples of potting mix test tools</u>

- Bioassay – germination test composted media
- pH, EC- electrodes
- Nutrient test kits – E.g. Nitrate, Phosphorus

Reference: Handreck & Black, 2010

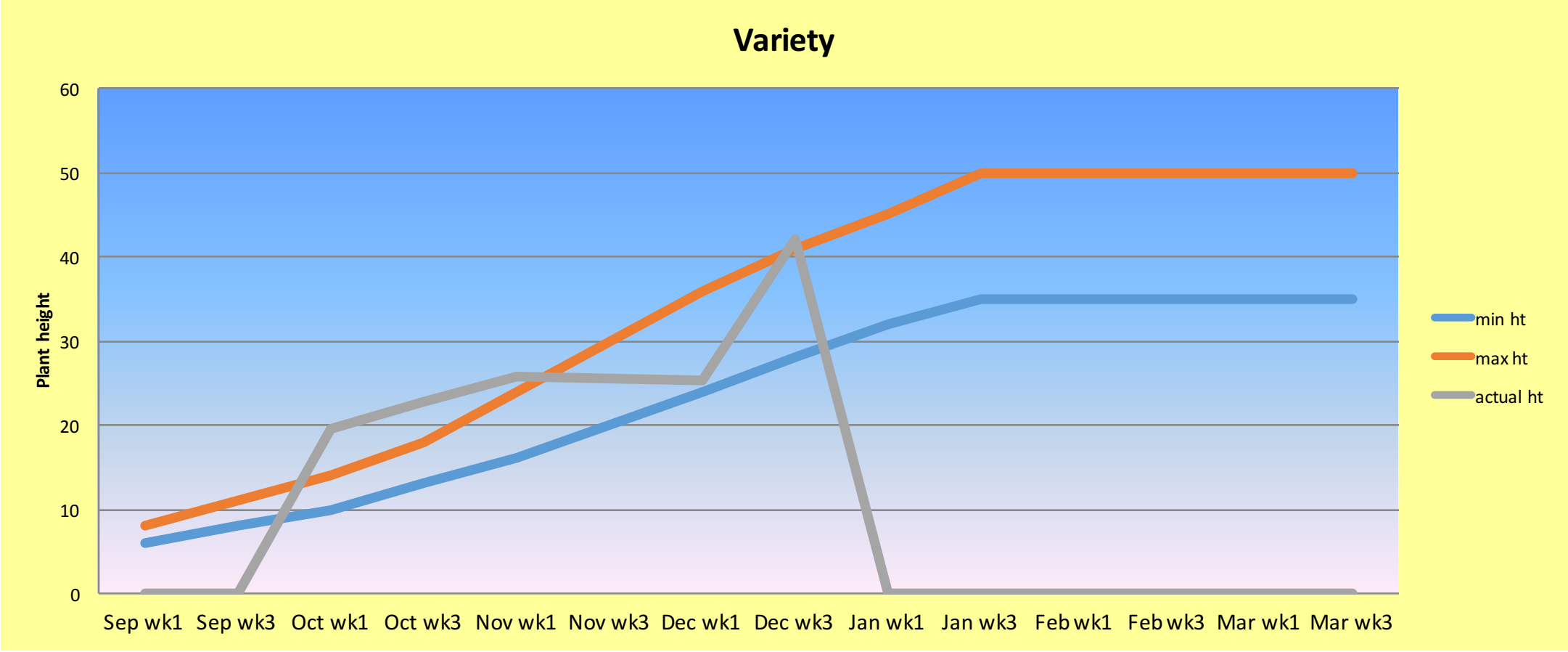
Growing media for ornamental plants and turf, UNSW Press

Monitoring and intervention: Plant

Purpose: Directly assess if progress is as expected

Vulnerability	Monitoring	Intervention
Yield	Growth tracking	Feed, Temperature
Nutrient	Growth (soil test)	Leaching, Feeding
Water	Dry/wet checks	!
Disease	disease scouting	Sprays, quarantine

Monitoring and intervention: Growth monitoring



Serruria; process design and monitoring

Vulnerability	Process Design	Monitoring
Yield	Conservative process (See below)	Growth tracking
Nutrient	Conservative Feed	Soil tests, tracking
water	Pot mix properties	Wet/dry checks
disease	Cover, drip, spray, batch	Scouting

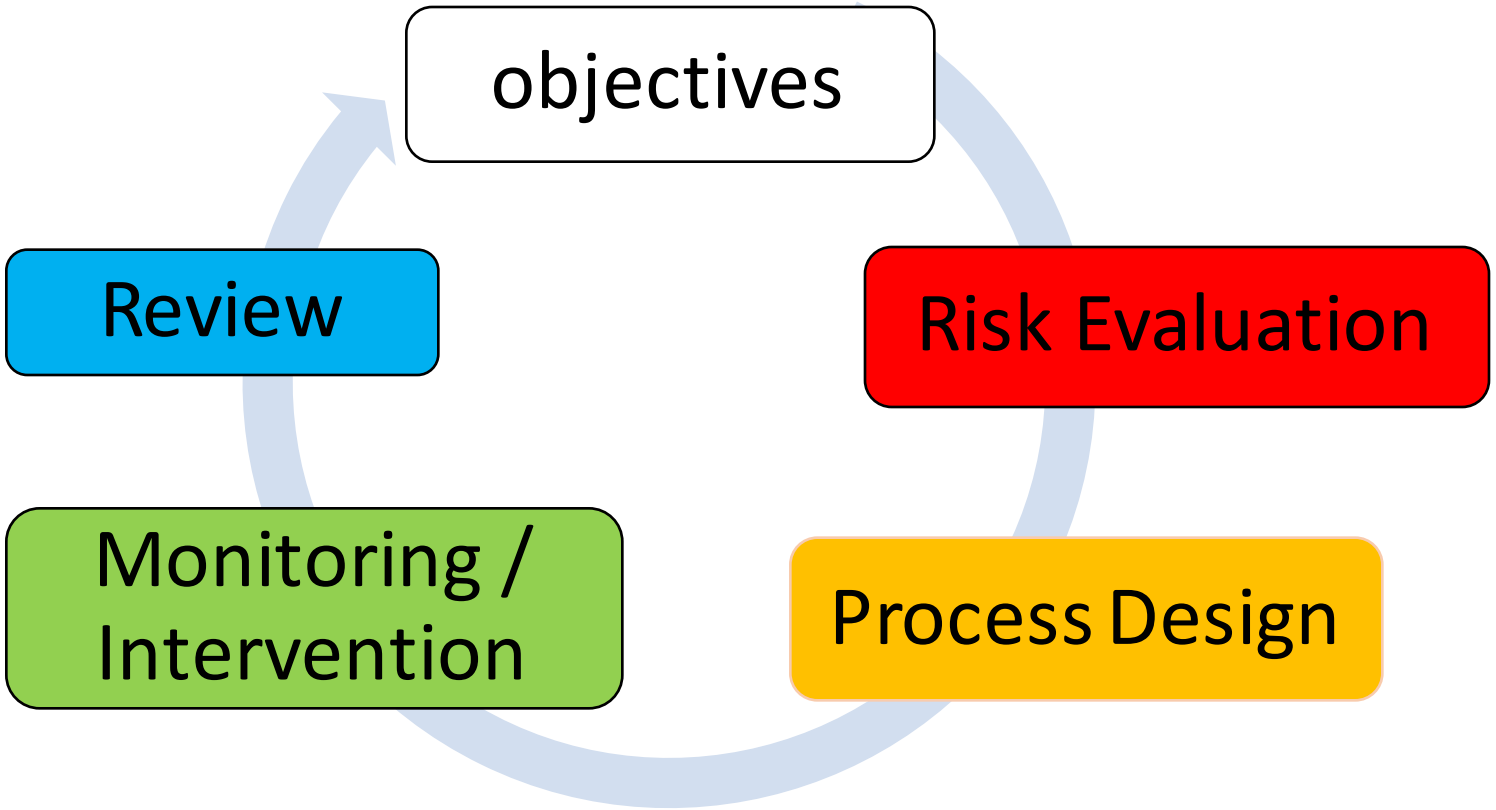
Review

"*Any man can make mistakes, but only a fool persists in his error." - Marcus Tullius Cicero (106 BC - 43 BC)*

Important to learn from experience

- What did we intend to do?
- What did we do?
- Was it effective?

Conclusion


objectives
Risk Evaluation
Process Design
Monitoring / Intervention
Review